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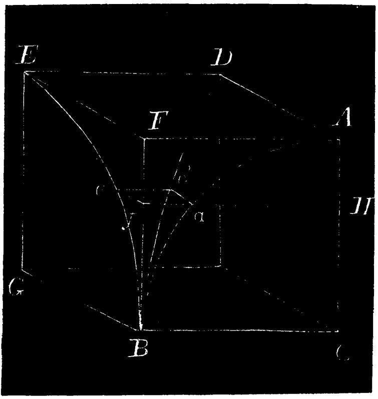
$$\frac{m\cos\theta+\cos^2\theta}{m^2—1}=\frac{1}{m^2—1}; \therefore \cos\theta=\frac{—m\pm\surd(m^2+4)}{2}.$$

This is the value of $\cos\theta$ when $\theta = DBC$. To see whether CD is a maximum ordinate, take any ordinate, as $JK = JB\sin\theta = \rho\sin\theta = (m\sin\theta + \cos\theta\sin\theta)\div(m^2—1)$; for a maximum, $m\cos\theta+\cos^2\theta=\sin^2\theta = 1—\cos^2\theta$. $\therefore 2\cos^2\theta—\frac{1}{2}m\cos\theta = \frac{1}{2}$; $\therefore \cos\theta = \frac{1}{4}[—m\pm\surd(m^2+8)]$, which differs from the value for $\theta = DBC$. It will be found moreover that no value for m will satisfy both equations. Therefore the curve is not symmetrical to the axis CD. Thus for $m=2$, we get $DBC= 65°32'$; whereas, for the max. ordinate, $\theta=68°31'$; showing that the highest point is to the left of D.

SOLUTION OF A PROBLEM IN MENSURATION, BY REQUEST. *Problem.*—Four cylinders of equal radii, r, intersect each other at right angles, two and two, in the same horizontal plane, each pair being tangent to each other and having their axes parallel. Required the contents of the solid bounded by the surfaces of the four cylinders and their common tangent plane.

Solution.—Let $ADEF$ represent one-fourth of the surface bounded by the common tangent plane, and $ADEFB$, one fourth of the required solid; then will ABC and BEG represent one-fourth the sectional areas of two of the intersecting cylinders.



Let $adef$ be a section of the required solid parallel to the common tangent plane and cutting the radius CA in H, and put $AH=x$. Then from property of the circle, we have

$$aH= \surd(2rx—x^2),$$

and consequently

$$fa = r—\surd(2rx—x^2),$$

= one of the equal sides of the variable plane $adef$. Hence the area of the variable plane $adef = [r—\surd(2rx—r^2)]^2$

$$= r^2+2rx—x^2—2r\surd(2rx—x^2).$$

Because the required solid is the *sum* of all its parallel planes, putting dx for the thickness of each plane and S for one-fourth the required solid, we have

$$dS = r^2dx+2rxdx—x^2dx—2r\surd(2rx—x^2)dx;$$

$$\therefore S = r^2x+rx^2—\tfrac{1}{3}x^3—\int_0^r \surd(2rx—x^2)dx$$

$$= \tfrac{5}{3}r^3—\tfrac{1}{2}r\times\text{area of circle whose radius is } r.$$

$$\therefore 4S = \tfrac{20}{3}r^3—2r\times\text{area of circle whose radius is } r.$$

If r = 7ft 3in, this becomes 2540.52—2394.39 = 146.13 cnbic feet.